

Facility Specific Mercury Variance Data Sheet

Directions: Please complete this form electronically. Record information in the space provided. Select checkboxes by double clicking on them. Do not delete or alter any fields. For citations, include page number and section if applicable. Please ensure that all data requested are included and as complete as possible. Attach additional sheets if needed.

Section I: General Information

A. Name of Permittee: City of Mellen

B. Facility Name: Mellen Wastewater Treatment Facility (WWTF)

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Mercury **Date completed:** September 20, 2019

E. Permit #: WI-0020311-10-0 **WQSTS #:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** January 1, 2020 est. **End Date:** December 31, 2024 est.

G. Date of Variance February 27, 2018

Application:

H. Is this permit a: ☒ **First time submittal for variance**

☐ **Renewal of a previous submittal for variance** (Complete Section X)

I. Description of proposed variance:

Variance for Mercury from the wildlife water quality-based criteria limit of 1.3 ng/L to an interim limit of 6.5 ng/L. The permittee has submitted an application for an alternative mercury effluent limitation (AMEL). The application included a pollutant minimization program (PMP) plan for mercury as required under s. NR 106.145(8), Wis. Adm. Code.

An alternative mercury effluent limitation under s. 106.145, Wisconsin Administrative Code represents a variance to water quality standards authorized by s. 283.15, Wis. Stats. The Department concludes that the City of Mellen has met the requirements of s. NR 106.145, Wisconsin Administrative Code and s. 283.15, Wisconsin Statutes. The Department further concludes that requiring the City of Mellen to meet the water quality standard for mercury would result in substantial and widespread adverse social and economic impacts in the service area of the City's WWTF. The Department proposes a variance to the water quality standard for wildlife.

Citation: An alternative mercury effluent limitation under s. NR 106.145, Wis. Adm. Code represents a variance to water quality standards authorized by s. 283.15, Wis. Stats.

J. List of all who assisted in the compilation of data for this form

Name	Email	Phone	Contribution
Sheri Snowbank	Sheri.snowbank@wisconsin.gov	715-635-4131	Multiple sections
Eric de Venecia	Eric.devenecia@wisconsin.gov	715-685-4155	Multiple sections
John Dougherty	No longer with the program		Part II - Limits
Diane Figiel	Diane.figiel@wisconsin.gov	608-264-6274	Parts II - Limits

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: 1.3 ng/L Wildlife Criterion

B. List other criteria likely to be affected by variance: 1.5 ng/L Human Threshold Criterion

C. Source of Substance: The Department assumes the majority of the mercury in the wastewater is from atmospheric deposition. Small contributions may come from such facilities as the school, industries, commercial establishments and residences.

D. Ambient Substance Concentration: 4.87 ng/L

☒ **Measured**

☐ **Estimated**

☐ **Default**

☐ **Unknown**

E. If measured or estimated, what was the basis? Include citation.

Background mercury concentrations used as the background condition for the WQBEL calculation were taken in the Bad River at Gilman Park just upstream of the City's outfall. Because background conditions exceed the WQC the

WQBEL is set equal to the criteria (1.3 ng/L). Various studies have put mercury concentrations of rainwater in Wisconsin in the range of 10 ng/L.																																	
F. Average effluent discharge rate: 0.201 MGD (April 2013–April 2018)		Maximum effluent discharge rate: 1.153 MGD (6/9/2017)																															
G. Effluent Substance Concentration: 6.5 ng/L (1-day P99) 3.1 ng/L (30-day P99) <u>Mean = 2.5 ng/L</u>		<input checked="" type="checkbox"/> Measured <input type="checkbox"/> Default	<input type="checkbox"/> Estimated <input type="checkbox"/> Unknown																														
H. If measured or estimated, what was the basis? Include Citation. The 1-day P99 is 6.5 ng/L, based on 11 valid sample results from October 2014 through November 2017 as determined by the procedures specified in s. NR 106.05(5)(a), Wis. Adm. Code. The average discharge concentration is 2.5 ng/L.																																	
I. Type of HAC: <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Type 1: HAC reflects waterbody/receiving water conditions </div> <div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Type 2: HAC reflects achievable effluent conditions </div> <div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Type 3: HAC reflects current effluent conditions </div>																																	
J. Statement of HAC: The Department has determined the highest attainable condition of the receiving water is achieved through the application of the variance limit in the permit, combined with a permit requirement that the permittee implement its Mercury PMP. Thus, the HAC at commencement of this variance is 6.5 ng/L, which reflects the greatest mercury reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Mercury PMP. The current effluent condition is reflective of on-site optimization measures that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for Mellen WWTF at this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request. A subsequent HAC cannot be defined as less stringent than this HAC.																																	
K. Variance Limit: 6.5 ng/L																																	
L. Level currently achievable (LCA): 6.5 ng/L – the value represents the 1-day P99.																																	
M. What data were used to calculate the LCA, and how was the LCA derived? <i>(Immediate compliance with LCA is required.)</i> The level currently achievable (LCA) is equal to the 1-day P99 of the effluent data and expressed as a daily maximum concentration.																																	
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Date</th> <th style="text-align: center;">Hg (ng/L)</th> <th style="text-align: left;">Date</th> <th style="text-align: center;">Hg (ng/L)</th> <th style="text-align: left;">Date</th> <th style="text-align: center;">Hg (ng/L)</th> </tr> </thead> <tbody> <tr> <td>10/09/2014</td> <td style="text-align: center;">1.41</td> <td>04/27/2016</td> <td style="text-align: center;">2.67</td> <td>06/07/2017</td> <td style="text-align: center;">2.03</td> </tr> <tr> <td>08/13/2015</td> <td style="text-align: center;">1.13</td> <td>09/14/2016</td> <td style="text-align: center;">0.824</td> <td>08/30/2017</td> <td style="text-align: center;">3.84</td> </tr> <tr> <td>11/04/2015</td> <td style="text-align: center;">1.53</td> <td>12/27/2016</td> <td style="text-align: center;">3.28</td> <td>11/14/2017</td> <td style="text-align: center;">3.55</td> </tr> <tr> <td>01/27/2016</td> <td style="text-align: center;">4.07</td> <td>03/24/2017</td> <td style="text-align: center;">3.6</td> <td></td> <td></td> </tr> </tbody> </table> <p>Citation: s. NR 106.145(5), Wis. Adm. Code.</p>				Date	Hg (ng/L)	Date	Hg (ng/L)	Date	Hg (ng/L)	10/09/2014	1.41	04/27/2016	2.67	06/07/2017	2.03	08/13/2015	1.13	09/14/2016	0.824	08/30/2017	3.84	11/04/2015	1.53	12/27/2016	3.28	11/14/2017	3.55	01/27/2016	4.07	03/24/2017	3.6		
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N. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation. The variance limit is equal to the 1-Day P99, in accordance with s. NR 106.145(5), Wis. Adm. Code.																																	
O. Select all factors applicable as the basis for the variance provided under 40 CFR 131.10(g). Summarize justification below: <div style="display: flex; justify-content: flex-end; margin-top: -20px;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 6 </div> <p>Section NR 106.145(1), Wis. Adm. Code, outlines several findings that justify variances for mercury. The Department intended that this provision be generally applicable to all dischargers of mercury, which produce large volumes of effluent with already extremely low mercury concentrations. The Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible.</p> <p>Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997, Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.</p>																																	

Section III: Location Information

- A. Counties in which water quality is potentially impacted: Ashland
- B. Receiving waterbody at discharge point: The Bad River in Ashland County within the Upper Bad River Watershed in the Lake Superior Drainage Basin
- C. Flows into which stream/river? Lake Superior How many miles downstream? Approximately 43 miles
- D. Coordinates of discharge point (UTM or Lat/Long): Outfall 002: Lat 46.213769° N Long 90.411418° W

E. What are the designated uses associated with this waterbody?

Full fish and aquatic life biological use (Cold water sport fish community and Class III trout stream), non-public water supply, recreational and within the ceded territory (Wild rice beds are documented downstream within the Bad River Slough (associated with the mouth of the river approximately 43 river miles downstream).

F. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the chronic criterion of the substance for aquatic life protection?

Ambient mercury concentrations in surface water resulting from the variance will be substantially less than levels that result in direct toxicity to aquatic organisms. EPA's current chronic aquatic life criterion for mercury is 0.9081 µg/L, which is approximately three orders of magnitude greater than the wildlife criteria (0.0013 µg/L). Wisconsin's criteria are 0.44 µg/L and 0.83 µg/L for chronic and acute toxicity, respectively.

G. Provide the equation used to calculate that distance. N/A**H. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody:** None

Permit Number	Facility Name	Facility Location	Variance Limit [µg/L]

Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet

I. Is the receiving waterbody on the CWA 303(d) list? If yes, please list the impairments below. ☐ Yes ☒ No ☐ Unknown

River Mile	Pollutant	Impairment

Section IV: Pretreatment (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)

- A. Are there any industrial users contributing mercury to the POTW? If so, please list. This POTW is not required to have a DNR-Approved Pretreatment program as the design flow is less than 5 MGD.
- B. Are all industrial users in compliance with local pretreatment limits for mercury? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc)
N/A
- C. When were local pretreatment limits for mercury last calculated? N/A
- D. Please provide information on specific PMP activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW
N/A

Section V: Public Notice

- A. Has a public notice been given for this proposed variance? ☒ Yes ☐ No
- B. If yes, was a public hearing held as well? ☒ Yes ☐ No ☐ N/A
- C. What type of notice was given?
☒ Notice of variance included in notice for permit ☐ Separate notice of variance

D. Date of public notice: _____ Date of hearing: December 11, 2019

E. Were comments received from the public in regards to this notice or hearing? <i>No public comments received. EPA submitted comments during public notice.</i> <input type="checkbox"/> Yes <input type="checkbox"/> No	
Section VI: Human Health	
A. Is the receiving water designated as a Public Water Supply? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
B. Applicable criteria affected by variance: 1.5 ng/L Human Threshold Criterion	
C. Identify any expected impacts that the variance may have upon human health, and include any citations: <ul style="list-style-type: none"> • The proposed variance will not adversely affect human health directly through the drinking water. • Wisconsin's fish consumption advisory program is designed to mitigate the effect of any ambient mercury concentration above the 1.5 ng/L water quality criterion for the protection of the fish-consuming human population, by providing advice to the public to guide them on the amount of fish that may be consumed safely. • Given the lack of wastewater treatment technologies capable of reducing mercury concentrations to achieve a 1.3 ng/L effluent limit, granting a variance in this situation is consistent with protecting the public health, safety and welfare because of the substantial public health and safety benefits of providing wastewater treatment, the continued commitment towards further mercury pollutant minimization, the Wisconsin fish advisory program, and the limited impact of the elevated effluent concentrations given the background on mercury concentrations. • DNR's findings suggest that Hg in walleye from Wisconsin lakes changed in the range of 0.5 to 0.8% per year depending on geographical position in the state during the period of 1982–2005. These trends may reflect geographically differing temporal trends in the amount of Hg deposited to Wisconsin lakes. However, long-term changes in other factors, such as water chemistry, fish growth rates, and lake levels, known to impact Hg bioavailability and accumulation may also be important. (Temporal trends of mercury concentrations in Wisconsin walleye (<i>Sander vitreus</i>), 1982–2005, Paul W. Rasmussen, Candy S. Schrank, Patrick A. Campfield. <i>Ecotoxicology</i> (2007) 16:541–550). 	
Section VII: Aquatic Life and Environmental Impact	
A. Aquatic life use designation of receiving water: Cold Water Sport Fishery	
B. Applicable criteria affected by variance: 1.3 ng/L Wildlife Criterion	
C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations: <p><u>Not Likely to Adversely Affect</u></p> <ul style="list-style-type: none"> • Ambient mercury concentrations resulting from the variance will be substantially less than levels that result in direct toxicity to aquatic organisms. EPA's current chronic aquatic life criterion for mercury is 0.9081 µg/L, which is approximately three orders of magnitude greater than the wildlife criteria (0.0013 µg/L). Wisconsin's criteria are 0.44 µg/L and 0.83 µg/L for chronic and acute toxicity, respectively. <ul style="list-style-type: none"> ○ Hine's emerald dragonfly (<i>Somatochlora hineana</i>, endangered) ○ Higgins' Eye mussel (<i>Lampsilis higginsii</i>, endangered) ○ Winged Mapleleaf mussel (<i>Quadrula fragosa</i>, endangered) ○ Spectaclecase (<i>Cumberlandia monodonta</i>, candidate) ○ Sheepnose (<i>Plethobasus cyphus</i>, candidate) • Low trophic level prey where mercury in prey is unlikely to accumulate to toxic levels in the organism. <ul style="list-style-type: none"> ○ Piping plover (<i>Charadrius melodus</i>, endangered) ○ Eastern massasauga rattlesnake (<i>Sistrurus catenatus catenatus</i>, candidate) <p><u>May Affect, Not Likely to Adversely Affect</u></p> <p>Bald eagle (<i>Haliaeetus leucocephalus</i>, Delisted due to Recovery)</p> <p>Bald eagles consume fish and waterfowl from surface waters, which puts them at risk of exposure to toxic levels of mercury due to bioaccumulation of mercury in their prey organisms. However, despite the potential for exposure, ambient surface water data show that in recent decades, mercury levels have not increased and bald eagle populations have continued to grow. This indicates that current ambient concentrations of mercury and mercury concentrations in prey organisms do not appear to be limiting recovery of bald eagle populations in Wisconsin. Although this variance will allow permitted dischargers additional time to identify and control</p>	

sources of mercury in their discharges, the pollutant minimization component of the variances should result in a net reduction in the amount of mercury discharged to Wisconsin surface waters from permitted point sources, further reducing any risk to bald eagles. In addition, the pollutant minimization programs encourage other pollution prevention efforts, which has a beneficial indirect effect of reducing the use and production of products and processes that use or contribute mercury to the environment. These efforts will also benefit bald eagles.

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:

Because mercury is pervasive, persistent and bio accumulating in the environment, we considered all species listed for the entire state of Wisconsin. The following is Federally Endangered, Threatened, Proposed, and Candidate Species in Wisconsin From U.S. Fish and Wildlife Service, Region 3, April 2015.

MAMMALS

Canada lynx (T)

Gray wolf (E)

Northern long-eared bat (T)

BIRDS

Northern Goshawk (SC)

Piping plover (E and CH)

Red Knot (T)

Spruce Grouse (T)

Bald Eagle (EAG)

REPTILE

Wood Turtle (T)

INSECTS

West Virginia White (SC)

Swamp Darner (SC)

Predaceous Diving Beetle (SC)

Citation: U.S. Fish & Wildlife Service – Environmental Conservation Online System

(<http://www.fws.gov/endangered/>) and National Heritage Index (<http://dnr.wi.gov/topic/nhi/>)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technologies in the treatment process:

The facility consists of two aerated lagoons operated one after another (in series). Within these ponds naturally occurring bacteria and organisms already present in the wastewater break down the organic matter. The water is further treated in a third non-aerated pond. Prior to discharge to the Bad River the treated wastewater (effluent) is disinfected seasonally (May through September) with a UV system.

B. What modifications would be necessary to comply with the current limits? Include any citations.

The Department did not evaluate what actions, modifications, or other changes would be needed to meet limits based on the water quality standard. As discussed below, the Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible.

Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997; Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.

C. Identify any expected environmental impacts that would result from further treatment, and include any citations:

See above.

D. Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge? ☐ Yes ☒ No ☐ Unknown

The Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible.

Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997; Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler

Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.

E. If treatment is possible, is it possible to comply with the limits on the substance? ☐ Yes ☒ No ☐ Unknown

F. If yes, what prevents this from being done? Include any citations.
See above.

G. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:

The Department did not evaluate what actions, modifications or other changes would be needed to meet limits based on the water quality standard. As discussed below, the Department considers treating to produce effluent at concentrations to meet the limit to be technically and economically infeasible.

Citation: Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy, April 24, 1997; Ohio Environmental Protection Agency, Division of Surface Water and Foster Wheeler Environmental Corporation and DRI/McGraw-Hill in support of Amended and New Rules in OAC Chapters 3745-1, -2, and -33.

Section IX: Compliance with Water Quality Standards

A. Describe all activities that have been, and are being, conducted to reduce the discharge of the substance into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations.

A condition of the variance is that the City of Mellen is to continue operation of its pollutant minimization program (PMP), which includes Mercury. Through a memorandum of understanding with the DNR a PMP was initiated in 2014. The updated PMP is required to be implemented during the current permit term, as a condition of the mercury variance.

- Contacted the School District, Nursing Home, Dentist (now closed) Industries and Septic haulers about mercury
- Participated in and supported the Ashland County Clean Sweep
- Sent community educational flyers to businesses and the public
- Monitored mercury levels in influent and effluent and submitted all required reports

B. Describe all actions that the permit requires the permittee to complete during the variance period to ensure reasonable progress towards attainment of the water quality standard. Include any citations.

The permit contains a variance to the wildlife water quality-based criterion for mercury granted in accordance with s. 283.15, Stats. As conditions of this variance the permittee shall (a) maintain effluent quality at or below the interim effluent limitation specified in the permit, (b) continue to implement mercury pollutant minimization measures, (c) follow the Pollutant Minimization Plan and (d) perform the actions listed in the schedule.

Section X: Compliance with Previous Permit (Variance Reissuances Only)

A. Date of previous submittal: _____ Date of EPA Approval: _____

B. Previous Permit #: _____ Previous WQSTS #: _____ (EPA USE ONLY)

C. Effluent substance concentration: _____ Variance Limit: _____

D. Target Value(s): _____ Achieved? ☐ Yes ☐ No ☐ Partial

E. For renewals, list previous steps that were to be completed. Show whether these steps have been completed in compliance with the terms of the previous variance permit. Attach additional sheets if necessary.

Condition of Previous Variance	Compliance
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No